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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/770,541	01/26/2001	Prithviraj Banerjee	NWU-P001	6788

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THE LAW OFFICE OF DEEPTI PANCHAWAGH-JAN
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EXAMINER	
CHU, CHRIS C	
ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/770,541

Applicant(s)

BANERJEE ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18 - 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18 - 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 3, 2004 has been entered. An action on the RCE follows.

Response to Amendment

2. Applicant's amendment filed on June 3, 2004 has been received and entered in the case.

Claim Objections

3. Claims 34 – 37 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The preambles of claims 34 - 37 are not consisting with the independent claim 33.

The preamble of claims 34 – 37 should be --the method for compiling a functional description of claim 33, further comprising the step of;--.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 18 - 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Bowen (U.S. Pub. No. US2002/0100029).

Regarding claims 18, 25 and 26, Bowen discloses in e.g., Fig. 2 and pages 19 - 32 a method for compiling a functional description expressed in an interpretive, algorithmic language into target code for selected hardware, the method comprising the steps of:

- A parser parsing (parser; 204) the functional description expressed in the interpretive, algorithmic language with at least one undeclared variable into an abstract syntax tree (page 6, section 0113 and pages 19 - 32);
- A type-shape analyzer (206), coupled to the parser, for inferring a type and a dimension to the undeclared variable by analyzing the use of the undeclared variable in the abstract syntax tree (i.e., Figs. 9A – 9D and pages 19 - 32);
- assigning the inferred type and dimension to the undeclared variable (i.e., Figs. 9A – 9D and pages 19 - 32);
- a statement deconstructor (210), coupled to the type-shape analyzer, for transforming a compound statement in the abstract syntax tree into a series of

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single statements (claim 1) and at least one simple statement (e.g. claim 26);

and

- a translator (214), coupled to the statement deconstructor (claim 25), for translating the abstract syntax tree into a register transfer level format.

Regarding claims 19, 27 and 34, Bowen discloses in e.g., Fig. 2 and pages 19 - 32 further comprising: a user directive file (202), coupled to the parser, for annotating the functional description with at least one user defined directive selected from the group consisting of constraint directives, assertions, and compiler hints.

Regarding claims 20, 28 and 35, Bowen discloses in e.g., Fig. 2 and pages 19 - 32 further comprising: a precision analyzer (pages 23 - 26), coupled to the type-shape analyzer, for determining the precision of the at least one undeclared variable and analyzing a value range of the at least one undeclared variable.

Regarding claims 21 and 29, Bowen discloses in e.g., Fig. 2 and pages 19 - 32 further comprising: a real number parser (pages 23 - 26), coupled to the precision analyzer, for parsing a real number into an integer part and a fractional part. wherein said real undeclared variable is one of said at least one undeclared variable.

Regarding claims 22, 30 and 36, Bowen discloses in e.g., Fig. 2 and pages 19 - 32 further comprising: a memory access optimizer (Figs. 9A - 9D and pages 19 - 32), coupled to the statement deconstructor, for analyzing array access patterns across loop iterations and replacing a statement in a loop including a memory access with multiple statements including the memory access to reduce the number of individual memory accesses.

Regarding claims 23, 31 and 37, Bowen discloses in e.g., Fig. 2 and pages 19 – 32 further comprising: a pipeline optimizer (Figs. 9A – 9D and pages 19 – 32), coupled to the statement deconstructor, for analyzing compound loop structures to identify pipeline opportunities and applying the pipeline algorithm to pipeline opportunities to generate nodes corresponding to the loop body, predicate nodes corresponding to loop conditional statements, and a schedule for scheduling pipeline operations.

Regarding claims 24 and 32, Bowen discloses in e.g., Fig. 2 and pages 19 – 32 the statement deconstructor for transforming a compound statement in the abstract syntax tree into at least one simple statement comprises: a scalarizer (i.e., codes in the page 24, Figs. 9A – 9D and pages 19 – 32), coupled to the type-shape analyzer, for expanding a matrix operation into at least one loop.

Regarding claim 33, Bowen discloses in e.g., Fig. 2 and pages 19 – 32 one or more computer readable storage devices having computer readable code embodied on said computer readable storage device, said computer readable code for programming one or more computers to perform a method for compiling a functional description expressed in an interpretive, algorithmic language into target code for selected hardware, the method comprising the steps of:

- parsing (204) the functional description expressed in the interpretive, algorithmic language with at least one undeclared variable into an abstract syntax tree (page 6, section 0113 and pages 19 – 32);
- inferring a type and a dimension to the undeclared variable by analyzing the usage of the undeclared variable in the abstract syntax tree (i.e., Figs. 9A – 9D and pages 19 - 32);

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- assigning (i.e., Figs. 9A – 9D and pages 19 - 32) the inferred type and dimension to the undeclared variable;
- transforming (210) compound statements in the abstract syntax tree into a series of single statements; and
- translating (214) the abstract syntax tree into a register transfer level format.

Response to Arguments

6. Applicant's arguments with respect to claims 18 - 37 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


ANNETTE M. THOMPSON
PRIMARY EXAMINER

Chris C. Chu
Examiner
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c.c.